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10/671,353	09/25/2003	Divya Vijayaraghavan	03-1844	7117

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LSI CORPORATION
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EXAMINER

MOUTAOUAKIL, MOUNIR

ART UNIT	PAPER NUMBER
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2619

MAIL DATE	DELIVERY MODE
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01/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/671,353

Applicant(s)

VIJAYARAGHAVAN ET AL.

Examiner

Mounir Moutaouakil

Art Unit

2619

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7 and 9-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-7, and 9-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The amendment filed 10/25/2007 has been entered and considered.

Claims 2 and 8 are cancelled.

Claims 1, 3-7, 9-37 remain rejected as discussed below.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-7, and 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sriram (US 5,463,620) in view of ^{Polan} et al (US 2003/0172123).

Hereinafter referred to as Polan.

Regarding claims 1 and 9. Sriram discloses a method for prioritizing frames for transmission from a local node according to frame type. The method comprises determining if a remote node is open (column 2, lines 60-67. fig 1. the nodes are interconnected). If the remote node is open (Node 14 is open), then determining if there are contexts for the remote node in which the contexts are arranged in at least first and second queues (fig 5. the data is transmitted to node 14 through the link 28. the contexts are arranged in multiple queues. first queue 32, second queue 44); if no contexts reside on the queues for the remote node (column 6, lines 20-44. server 48 empties the queues from content), then examining an on-chip context cache to

determine a context for the remote node (column 6, lines 20-44. the server check the next queue for context for the node 14).

Sriram does not specify ^{disclose} that the remote node is a device on a fiber channel or the method is performed by another device on fiber channel. However, Polan discloses a method of implementing ATM over Fiber channel (see paragraph 0034). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use ATM over fiber channel, as taught by Polan, into the loop (fig 1, 10, 14, 16) of Sriram for the purpose of taking advantage of the higher bandwidth that the fiber channel provide.

Regarding claim 3. Sriram discloses a method that further comprises if there are contexts in the on-chip context cache for the remote node, then retrieving and queuing cached context for the remote node (see column 6, lines 20-44. the server transmits any context located within the next queue to the node 14).

Regarding claim 4. Sriram discloses a method that determines if there is context on the data queue for the remote node (see column 6, lines 20-44. The server locates context availability within each queue including the data queue).

Regarding claim 5, the method of Sriram comprises that if there is context on the data queue for the remote node, then prioritizing context on the data queue for the lowest direct memory access latency for the remote node (column 8, lines 39-49, low bandwidth is allocated for low priority queue. 15 cells per cycle).

Regarding claims 6 and 7. Sriram discloses a method of prioritizing an earliest queued context for the remote node with the highest weight (fig 5, column 6 lines 20-44.

The server defines time cycles for each queue. T1 is the first cycle granted for queue 32 because voice has more weight than data. 30 cells per cycle).

Regarding claim 10. Sriram discloses a method wherein the contexts are arranged in a third queue (fig.5 queue 36).

Regarding claim 11. Sriram discloses a method wherein each of the first second third queues stores a unique type of frame (fig.5).

Regarding claim 12. Sriram discloses a method wherein the contexts are arranged in fourth and fifth queues (fig.5).

Regarding claims 13 and 14. Sriram discloses a method where five different queues with assigned priority (fig.5).

Regarding claim 15. Sriram discloses a method. The method comprises determining a set of transmit frame types (fig 5. 8 determines the frames types), the set being at least two in number (fig 5. the fig illustrates multiple types); assigning a priority to each of the transmit frame types of the set (fig.5 each type is allocated a different bandwidth based on the frame type), priority being assigned based at least in part on equation $\text{priority value} = A * \text{priority type} + B * \text{time of entry}$, A and B being at least one of fixed constants and variables (if $A=1$ and $B=0$ then the priority value = priority type, as disclosed by Sriram); preparing frames for transmission (the frames are going to be transmitted through the link 28); examining the frames for transmission to determine transmission type (fig.5, based on the context type each frame is allocated a different bandwidth); and placing context about the frame for transmission in a queue

corresponding the determined transmission type (fig.5 frames are queued based on the context within), wherein each of the determined set of transmit frame types has a unique queue (fig 5. each frame type has a unique queue).

Regarding claim 16. Sriram discloses a method that determines if a device is open with a desired remote node (column 2, lines 60-67. fig 1. the nodes are interconnected. The remote node is 14).

Regarding claim 17. Sriram discloses a method that if a device is open with the desired remote node, then prioritizing the earliest queued context with the highest priority (fig.5, queue 46 is granted a 45MB/s (135 cell per cycle)).

Regarding claim 18. Sriram discloses arbitrating for the desired remote node (fig.5 element 48).

3. Claims 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sriram in view of Polan and further in view of Fukano et al (US 5,774,453). Hereinafter referred to as Fukano.

Regarding claim 19. Sriram in view of Polan discloses a method that determines if there is a context on any queue corresponding to the determined set of transmits frames type (see column 6, lines 20-44).

Sriram does not disclose ~~that~~ that transmitting node recognizes that the desired note is not open anymore. However, Fukano discloses a method where whenever a node is congested, it transmits a pause or a stop transmission request. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to

implement the method of stopping transmission, as taught by Fukano, into the node of Sriram for the purpose controlling the data flow.

Regarding claim 20. Sriram determines if there is context on a data queue for the desired remote node (column 6, lines 20-40).

Regarding claim 21. Sriram discloses a method of prioritizing and earliest queued context with the highest weight for the desired note (fig.5. Queue with the highest priority receives the highest bandwidth).

Regarding claim 22. Sriram discloses if there is no context on any queue corresponding to the determined set of transmit frame types, then determining if there is context on queues that can transfer (see column 6, lines 20-44).

Regarding claim 23, Sriram discloses if there is context on any queue that can transfer, then determining if there is context on the data queue that can transfer (see column 6, lines 20-44).

Regarding claim 24, the method of Sriram comprises that if there is context on the data queue for the remote node, then prioritizing context on the data queue for the lowest direct memory access latency for the remote node (column 8, lines 39-49, low bandwidth is allocated for low priority queue. 15 cells per cycle).

Regarding claim 25. The method of Sriram comprises prioritizing an earliest queued context that is capable of transferring by the highest weight (fig.5).

4. Claims 26-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullendore et al (US 7,215,680) in view of Sriram. Hereinafter referred to as Mullendore.

Regarding claim 26. The prior art of Mullendore discloses a plurality of nodes (fig.1A), each of the plurality of nodes communicatively coupled to all other nodes of the plurality of nodes in a loop topology (fig.1A), each of the plurality of nodes capable of receiving information from every other node of the plurality of nodes and capable of transmitting information to every other node of the plurality of nodes per loop (fig.1A), such that no two nodes transmit to a same node in a loop (fig.1A).

Mullendore does not disclose that the communications between nodes uses multiple queues to determine priority for transmitting frames of information. However, Sriram discloses a method where the communication between nodes uses multiple queues to determine priority for transmitting frames of information (fig 1 and 5); wherein the queues are examined for context when no context reside on other queues. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement nodes that employ multiple queues to determine priority for transmitting frames of information, as taught by Sriram, into the loop topology of Mullendore for the purpose of enhancing data flow, priority and avoiding congestion.

Regarding claims 27, Mullendore discloses a system of communication wherein the loop topology is a fiber channel arbitrated loop (see background of Mullendore, paragraph [003]).

Regarding claims 28-33. Mullendore discloses all the limitations of the parent claim with the exception of wherein the queues are multiple queues for multiple sets of frames. However, Sriram discloses a queuing method where the node queues multiple incoming frames within different queues. Each set of frames is queued in a separate queue. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement the method of using multiple queues for multiple sets of frames, as taught by Sriram, into the communication system of Mullendore for the purpose of allocating different bandwidths for different sets of frames depending on priority and enhancing data transmission.

Regarding claim 34. Mullendore discloses a system wherein the plurality of nodes are two to 126 in number (fig.1A).

Regarding claim 35. Mullendore and Sriram discloses all the limitations of the parent claim with the exception of wherein the plurality of nodes are in a dual loop arrangement such that each node receives and transmits information to each of two nodes through two loops in which information flows in opposite directions. However, examiner takes official notice that it is well known in the art how to convert a half duplex loop or ring to a full duplex loop. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to convert a half duplex loop to a full duplex loop for the purpose of increasing efficiency and avoiding latency.

Regarding claim 36. Mullendore discloses a system wherein a node corresponds to one device (fig.1A, 710).

Regarding claim 37. Mullendore discloses a system wherein a node corresponds to a plurality of devices (fig1A, 710 and 700).

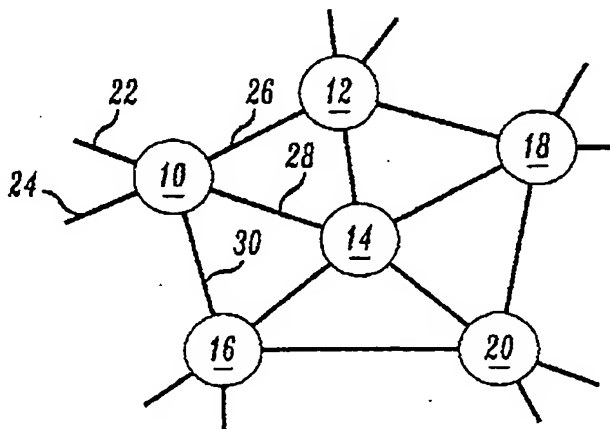
Response to Arguments

5. Applicant's arguments filed 10-25-2007 have been fully considered but they are not persuasive.

1st Argument:

Applicants argue on pages 8 and 9 that Sriram does not teach that **the remote node is a device on a fiber channel arbitration loop**.

Examiner respectfully disagrees. The limitation being argued was previously presented as claim 8. The previous office action stated that the limitation above was not clearly addressed by Sriram (see previous office action). However, applicants are reminded that ATM cells are always transmitted over fiber channels. Since Sriram did not have explicit support for the limitation in argument, Polan was introduced in combination with Sriram to teach the possibility of using fiber channels. Moreover, it can be clearly seen that the arbitrated loops can be chosen from the multiple organized loops illustrated in Fig.1 of Sriram (10, 12, 14 or 10, 12, 18, 14 or).



2nd Argument:

Applicants argue that the 103 rejections are improper.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Moreover, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

3rd Argument:

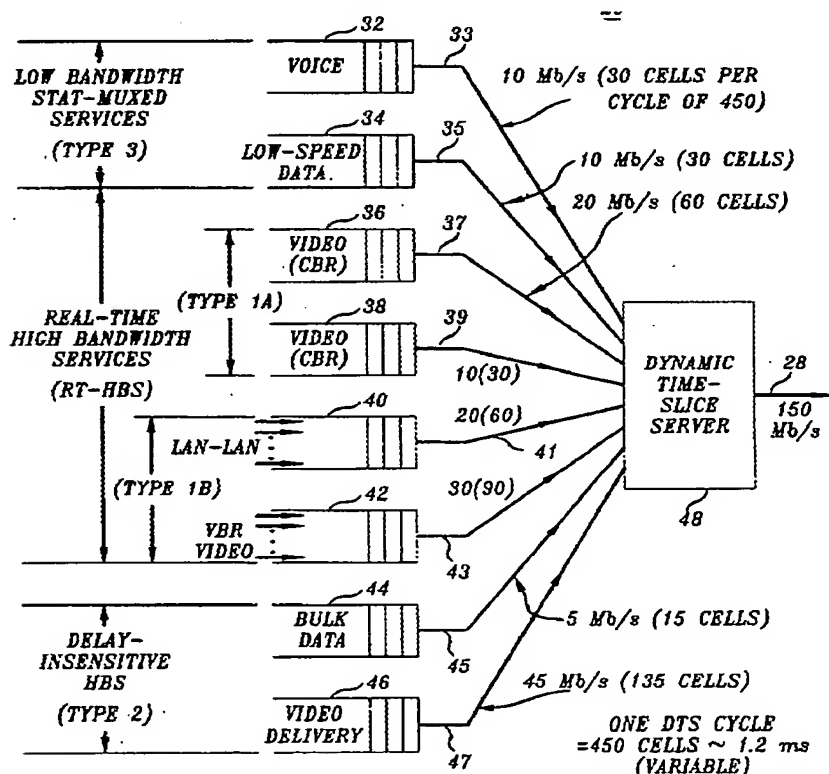
Applicants argue that Sriram does not teach or disclose an on-chip cache. Examiner respectfully disagrees, although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Moreover, it is given the broadest interpretation as allowed in the art. Sriram teaches skipping a first empty queue to move on to a second queue in order to remove data from the second queue,

destined to the remote node. The on-chip cache is interpreted as a queue based on the claim language. Furthermore, the claim language does not include **an on-chip cache will be examined in an effort to locate a context for the current remote node and loop.**

4th argument:

Applicant argues that Sriram does not teach "assigning a priority to each of the transmit frame types of the set, priority being assigned based at least in part on equation $\text{priority_value} = A * \text{priority-type} + B * \text{time-of-entry}$, A and B being at least one of fixed constants and variables."

Examiner respectfully disagrees. Sriram discloses assigning priority to each of the transmit frames types, as it can be seen below



Moreover, if A is set to 1 and B is set to 0 the priority value will be equal to the priority type as disclosed by Sriram. Thus, the prior art disclosed above teaches all the limitations of the claimed invention with no exceptions.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

When responding to this office action, applicants are advised to clearly point out the patentable novelty which they think the claims present in view of the state of the art disclosed by the references cited or the objections made. Applicants must also show how the amendments avoid such references or objections. See 37C.F.R 1.111(c). In addition, applicants are advised to provide the examiner with the line numbers and pages numbers in the application and/or references cited to assist examiner in locating the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mounir Moutaouakil whose telephone number is 571-270-1416. The examiner can normally be reached on Monday-Thursday (1pm-4: 30pm) eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571-272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MM
Mounir Moutaouakil
Patent Examiner
01-16-2008



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